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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|---------------------|
| 10/658,385 | 09/10/2003 | Do-Sung Kim | 8733.824.00-US | 3312 |
| 30827 | 7590 | 01/11/2005 | EXAMINER | |
| MCKENNA LONG & ALDRIDGE LLP 1900 K STREET, NW WASHINGTON, DC 20006 | | | | SCHECHTER, ANDREW M |
| | | ART UNIT | | PAPER NUMBER |
| | | 2871 | | |

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/658,385 | KIM ET AL. | |
| | Examiner | Art Unit | |
| | Andrew Schechter | 2871 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 10 September 2003.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-61 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) 1-30 and 40-61 is/are allowed.

6) Claim(s) 31-39 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 10 September 2003 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/10/03.

4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5) Notice of Informal Patent Application (PTO-152)

6) Other: _____.

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

2. Claim 1 is objected to because of the following informalities: "of the pixel region" in line 6 should be "in the pixel region". Appropriate correction is required.
3. Claim 31 is objected to because of the following informalities: "to the portion" in the last line should be "to a portion". Appropriate correction is required.
4. Claim 48 is objected to because of the following informalities: "to the portion" in line 10 should be "to a portion". Appropriate correction is required.
5. Claim 56 is objected to because of the following informalities: "the horizontal electrode" in line 12 should be "the horizontal electrodes". Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 31, 34, and 36-39 are rejected under 35 U.S.C. 102(b) as being anticipated by *Matsuyama et al.*, U.S. Patent No. 6,300,996.

Matsuyama discloses [see Fig. 4, for instance] an array substrate for an LCD comprising a substrate having a plurality of pixel regions, each having first and second regions [below 11, 11 and above, for instance], gate and data lines [22, 23], TFT with gate electrode [33], semiconductor [35], source and drain electrodes [36, 37 (with names reversed from the present application)], an auxiliary electrode [11] having a plurality of portions [the horizontal part of 11 and the vertical segment of 11 above it] in the second region of the pixel region, a pixel electrode [38] having at least one slit [39b] corresponding to a portion of the auxiliary electrode [vertical segment of 11]. Claim 31 is therefore anticipated.

The drain electrode is extending in a horizontal direction to the gate line (here meaning to the gate electrode, which is part of the gate line), so claim 34 is also anticipated. The second region has a plurality of domains [38a and 38c], so claim 36 is also anticipated. Each domain has a symmetric liquid crystal alignment with respect to the portion of the alignment electrode [see Fig. 5], so claim 37 is also anticipated. The gate line forms a fringe field in the first region, so claim 38 is also anticipated.

Matsuyama discloses the method of making this device, so claim 39 is also anticipated.

8. Claims 31-34, 36, 38, and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by *Kim et al.*, U.S. Patent Application Publication 2001/0019391.

Kim discloses [see Fig. 9C] an array substrate for an LCD comprising a substrate having a plurality of pixel regions, each having first and second regions [lower 1/3, upper 2/3, for instance], gate and data lines [1, 3], TFT with gate electrode [11], semiconductor [5], source and drain electrodes [7, 9], an auxiliary electrode [15] having a plurality of portions in the second region of the pixel region, a pixel electrode [13] having at least one slit [51] corresponding to a portion of the auxiliary electrode [diagonal segment at top]. Claim 31 is therefore anticipated.

The auxiliary electrode has a zigzag pattern, so claim 32 is also anticipated. The slit corresponds to a diagonal portion of the auxiliary electrode, so claim 33 is also anticipated. The drain electrode is extending in a horizontal direction to the gate line, so claim 34 is also anticipated. The second region has a plurality of domains [triangular sections], so claim 36 is also anticipated. The gate line forms a fringe field in the first region, so claim 38 is also anticipated.

Kim discloses the method of making this device, so claim 39 is also anticipated.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Matsuyama et al.*, U.S. Patent No. 6,300,996, as applied above, and further in view of *Kwon et al.*, U.S. Patent Application Publication 2002/0097364.

Matsuyama discloses the drain electrode spaced apart from the source electrode, but does not disclose the source electrode having a U-shape. *Kwon* does disclose [Fig. 5a] a TFT with the source electrode having a U-shape. It would have been obvious to one of ordinary skill in the art at the time of the invention to use such a TFT having a u-shaped source electrode, motivated by *Kwon's* teaching [paragraph 0049] that by doing so the size of the TFT may be made smaller than the conventional TFT, thereby increasing the aperture ratio and improving the display quality. Claim 35 is therefore unpatentable.

Allowable Subject Matter

11. Claims 1-30 and 40-61 are allowed.

12. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose the liquid crystal display device of claim 1, in particular the limitations that there is a first auxiliary electrode under the data line, a plurality of horizontal second auxiliary electrodes, and protrusions on the second substrate between the second auxiliary electrodes. Claim 1 is therefore allowed, as are dependent claims 2-15.

The prior art does disclose the method of manufacturing a liquid crystal display device of claim 16, in particular the limitations of forming a first auxiliary electrode and a plurality of second auxiliary electrodes, the first auxiliary electrode having first and second portions spaced apart from each other under the data line, the second auxiliary electrode connecting the second portion of the first auxiliary electrode to a first portion of another first auxiliary electrode under an adjacent data line, and protrusions on the second substrate between the second auxiliary electrodes. Claim 16 is therefore allowed, as are dependent claims 17-30.

The prior art does not disclose the liquid crystal display device of claim 40, in particular the limitations that there is an auxiliary electrode having a plurality of portions in the second region of the pixel region, the pixel electrode having at least one slit corresponding to a portion of the auxiliary electrode [so far like claim 31, rejected above], and also having a protrusion on the second substrate formed around the second region and in the second region at positions corresponding to the portions of the auxiliary electrode that does not correspond to the slit. Claim 40 is therefore allowed, as are dependent claims 41-47.

Analogously, the prior art does not disclose the method of making a liquid crystal display device of claim 48, in particular the limitations of forming an auxiliary electrode having a plurality of portions in the second region of the pixel region, the pixel electrode having at least one slit corresponding to a portion of the auxiliary electrode [so far like claim 39, rejected above], and also forming a protrusion on the second substrate formed around the second region and in the second region at positions corresponding to the

portions of the auxiliary electrode that does not correspond to the slit. Claim 48 is therefore allowed, as are dependent claims 49-55.

The prior art does not disclose the liquid crystal display device of claim 56, in particular the limitations that there is an auxiliary electrode having a vertical electrode under the data line and a plurality of horizontal electrodes connecting to the vertical electrode, and protrusions on the second substrate between the slits in the pixel electrode. Claim 56 is therefore allowed, as are dependent claims 57-61.

Note, however, the objections above to claims 1, 48, and 56.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (571) 272-2302. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Andrew Schechter
Andrew Schechter
Patent Examiner
Technology Center
9 January 2005